

PTO 04-2595

Japanese Kokai Patent Application  
No. Hei 9[1997]-77136

LAMINATED BOTTLE

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UNITED STATES PATENT AND TRADEMARK OFFICE  
WASHINGTON, D.C. APRIL 2004  
TRANSLATED BY THE RALPH MCELROY TRANSLATION COMPANY

JAPANESE PATENT OFFICE  
PATENT JOURNAL (A)  
KOKAI PATENT APPLICATION NO. HEI 9[1997]-77136

Int. Cl. <sup>8</sup> :	B65 D 77/06 25/16
Filing No.:	Hei 7[1995]-235462
Filing Date:	September 13, 1995
Publication Date:	March 25, 1997
No. of Claims:	4 (Total of 5 pages; OL)
Examination Request:	Not filed

LAMINATED BOTTLE

[Sekiso botoru]

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[There are no amendments to this patent.]

Claims

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1. A laminated bottle characterized by the fact that it is a laminated bottle provided with not less than two layers composing the inner layer and the outer layer, which are laminated to be peelable from each other, and one section of this inner layer and outer layer are joined at a joint part extending along the axial direction,

wherein the aforementioned joint part is provided at three places separated from each other in the circumferential direction and the separating measurement measured along the circumferential direction of the two adjacent joint parts and the measurement between the said two joint parts measured linearly through the center of the axis of the laminated bottle are set to be approximately the same measurement.

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\* The numbers in the margin indicate pagination in the foreign text.

2. The laminated bottle according to Claim 1 characterized by the fact that at least one air hole is provided at the aforementioned outer layer between the respective joint parts.

3. The laminated bottle according to Claim 1 characterized by the fact that it has a cylindrical shape and three of the aforementioned joint parts are provided at equal spacing in the circumferential direction.

4. The laminated bottle according to Claim 1 characterized by the fact that it has a rectangular cylindrical shape and four of the aforementioned joint parts are provided at equal spacing in the circumferential direction.

#### Detailed description of the invention

[0001]

##### Industrial application field

The present invention relates to a laminated bottle wherein the inner layer peels off and shrinks from the outer layer as the contents decrease.

[0002]

##### Prior art

Regarding this type of laminated bottle, there are those mentioned in Japanese Kokai Patent Application No. Hei 4[1992]-339759, Japanese Kokai Patent Application No. Hei 5[1993]-310265, etc., which the present applicant has already applied for and have been laid-open.

[0003]

This laminated bottle is constituted by the inner layer being laminated to the inside of the outer layer such that they are peelable from each other and one part of the outer layer and the inner layer are joined. Various positions can be considered as the joint part that joins the outer layer and the inner layer and as one mode, one can provide the joint part linearly along the axial direction of the laminated bottle.

[0004]

##### Problems to be solved by the invention

Figure 6 is a lateral cross sectional view of laminated bottle (30) that has only one joint part (33) extending linearly along the axial direction. In this case, when inner layer (32) peels off from outer layer (31) as the contents decrease, the peeling starts from a position removed from joint part (33). Then, when shrinking of inner layer (32) progresses, inner layer (32) that

peeled off closely contacts inner layer (32) in the vicinity of joint part (33) and closed spaces (34) and (35) are formed on both sides of this closely contacted section as shown in Figure 6.

[0005]

When closed spaces (34) and (35) are formed as described above, the contents within closed spaces (34) and (35) could not be extracted and were left in the bottle, hence it was not economical.

[0006]

Also, often with this type of laminated bottle, an extraction pump (not shown in the figure) is mounted to the opening part of the laminated bottle and the suction tube of the extraction pump is inserted into the inner layer from the opening part. However, if the inner layer that peeled off shrinks as described above, the inner layer pushes and bends the suction pipe. This prevents normal operation of the extraction pump and there are cases having a negative effect in extracting the contents.

[0007]

The aforementioned problem occurs similarly even when two joint parts that extend linearly along the axial direction and are opposite in the circumferential direction are provided. The reason is that if the joint parts are provided as described above, the inner layer is divided into two, peeling of the inner layer starts from one of the two sides then progresses, and both sides do not peel off and shrink simultaneously. The reason for the peeling starting only from one side as described above is that generally, the thickness of the inner layer is uneven in the circumferential direction and the thinner side tends to peel off from the outer layer rather than the thicker side. Also, it is difficult to arrange the joint parts accurately at equal spacing when providing the joint parts at two places in the circumferential direction and a slight difference in the measurement is created in the circumferential direction and in such a case, the side that has a longer circumferential length tends to peel off from the outer layer rather than the shorter side.

[0008]

The present invention was made by taking the aforementioned problems in the prior art into consideration and the purpose thereof is to provide a laminated bottle capable of extracting all of the contents. Also, another purpose of the present invention is to obtain a laminated bottle that does not prevent a normal operation of the extraction pump.

[0009]

Means to solve the problems

In order to solve the aforementioned problems, the present invention is a laminated bottle characterized by the fact that it is a laminated bottle provided with not less than two layers composing the inner layer and the outer layer, which are laminated to be peelable from each other, and one section of this inner layer and outer layer are joined at a joint part extending along the axial direction, wherein the aforementioned joint part is provided at three places by being separated from each other in the circumferential direction and the separating measurement measured along the circumferential direction of the two adjacent joint parts and the measurement between said two joint parts measured linearly through the center of the axis of the laminated bottle are set to be approximately the same measurement (corresponds to Claim 1).

[0010]

In the laminated bottle of the present invention, the inner layer divides in same number as the number of joint parts, peels off, and shrinks when the inner layer peels off from the outer layer and shrinks as the content decreases. From which section of the inner layer the peeling starts is determined by the difference in the circumferential length between the joints parts and the distribution in the thickness of the inner layer. When the inner layer in the section that peeled off first finishes shrinking, peeling of another section starts, and the peeling and shrinking occur successively

[0011]

The measurement between the joint parts is set as described above hence each section of the inner layer that was divided by the joint parts finishes shrinking when the middle part of each section reaches the center of the axis of the laminated bottle. Further shrinking is impossible from the stand point of the measurement

[0012]

Even if a suction tube of the extraction pump is arranged at the center of the axis of the laminated bottle, the inner layer that shrank does not bend the suction tube.

[0013]

It is preferable to provide at least one air hole between each of the joint parts of the aforementioned outer layer (corresponds to Claim 2). By doing so, flow of air between the

outer layer and the inner layer is reliably enabled from the air holes and the inner layer can shrink surely and smoothly. The perforating position of the air hole can be any position among the opening part, body part, bottom part, etc. of the laminated bottle.

[0014]

If the laminated bottle has a cylindrical shape, provide three joint parts at equal spacing in the circumferential direction (corresponds to Claim 3). If the laminated bottle has a rectangular cylindrical shape, provide four joint parts at equal spacing in the circumferential direction (corresponds to Claim 4).

[0015]

<Materials in the present invention> The outer layer can be composed from, for example, high density polyethylene, the inner layer can be composed from, for example, nylon, and the joint parts can be composed by joining the outer layer and the inner layer with, for example, “Adomer [transliteration]” trade name of a product made by Mitsui Petrochemical Industries Co., Ltd

[0016]

If nylon is employed for the inner layer, the moisture permeability of nylon is high, hence it is possible to reduce the moisture permeability of the inner layer by laminating another layer (“Adomer,” etc.) composed from a resin that has a high gas barrier property on the inside of the nylon to compose the inner layer.

[0017]

However, the material of the outer layer, the inner layer, and the adhesive for forming the joint parts are not restricted to the examples given above.

[0018]

Embodiments of the invention

Embodiments of the present invention will be described based on Figures 1 ~ 5.

[0019]

# First embodiment

Figure 3 is a plan view in the first embodiment of the laminated bottle according to the present invention and Figure 1 and Figure 2 are lateral cross sectional views of the [main] body parts thereof.

[0020]

Laminated bottle (1) is provided with cylindrical body part (2) and cylindrical opening part (3) connected to the upper part of body part (2). Laminated bottle (1) is composed by laminating outer layer (11) and inner layer (12) over the entire body thereof from opening part (3) to bottom part (4) of body part (2). Outer layer (11) and inner layer (12) are joined to each other at three joint parts (13A), (13B), and (13C). However, in areas other than these joint parts (13), outer layer (11) and inner layer (12) only make contact and are peelable from each other. Figure 2 shows the state prior to when inner layer (12) is peeled off from outer layer (11).

[0021]

Three joint parts (13) are arranged at equal spacing in the circumferential direction, joint parts (13A), (13B), and (13C) extend linearly in a band along the axial direction of laminated bottle (1) from the extreme end of opening part (3) to the bottom edge of body part (2) and extend to the center of bottom part (4).

[0022]

Incidentally, if the major diameter of inner layer (12) is D, separating measurement ( $L_1$ ) measured along the circumferential direction of two adjacent joint parts (e.g., 13A and 13B) is

$$L_1 = \pi D/3 = 1.05D$$

and this is approximately the same measurement as measurement  $L_2 = D$  between said two joint parts (13A, 13B) that was measured linearly through center of axis (P) of laminated bottle (1). This relationship in the measurement is the same even between joint parts (13B) and (13C) or joint parts (13C) and (13A).

[0023]

Air hole (13) is provided to outer layer (11) at opening part (3) of laminated bottle (1) between each joint part (13) and (13). Air hole (14) penetrates only outer layer (11) and does not penetrate inner layer (12).

[0024]

In this laminated bottle (1), an extraction pump not shown in the figure is mounted to opening part (3), the suction tube of the extraction pump is inserted into inner layer (12) from opening part (3), and the contents stored inside inner layer (12) are extracted by being pumped up. At this time, the suction tube of the extraction pump is usually arranged at approximately the center of the axis of laminated bottle (1).

[0025]

Inner layer (12) peels off from outer layer (11) and shrinks as the contents inside inner layer (12) decrease. Incidentally, inner layer (12) is divided into three sections in the circumferential direction by joint parts (13) so as to peel off and shrink successively in each divided section.

[0026]

Which section of inner layer (12) starts to peel off and shrink first depends on the difference in the measurement of the circumferential length between joint parts (13) and (13) or the distribution in the thickness of inner layer (12) and another section does not peel off and shrink until the section that peeled off first finishes shrinking.

[0027]

For example, if inner layer (12A) positioned between joint parts (13A) and (13B) in Figure 2 starts to peel off from outer layer (11) first, inner layer (12B) positioned between joint parts (13B) and (13C) or inner layer (12C) positioned between joint parts (13C) and (13A) does not peel off from outer layer (11) until inner layer (12A) finishes shrinking.

[0028]

The length along the circumferential direction of inner layer (12A) is approximately equal to the major diameter measurement of inner layer (12), hence inner layer (12A) finishes shrinking at the point in time the middle part in the circumferential direction thereof contacts the suction tube of the extraction pump. Then, when shrinking of inner layer (12A) ends, inner layer (12B) or inner layer (12C) starts to peel off from outer layer (11) and shrinks and when shrinking of the pertinent inner layer finishes, the last remaining inner layer starts to peel off from outer layer (11) and shrinks.



[0029]

Figure 1 shows a state wherein all three sections of inner layers (12A) ~ (12C) have finished shrinking. At this time, all the middle parts of three inner layers (12A) ~ (12C) contact the suction tube of the extraction pump as well as half of inner layers (12A), (12B), and (12C) of adjacent sections making surface contact.

[0030]

Inner layer (12) always shrinks in this form hence almost all of the contents can be extracted with the extraction pump. When inner layers (12A) ~ (12C) shrink, air flows in between outer layer (11) and inner layers (12A) ~ (12C) from air holes (14) provided at the corresponding positions to reliably and smoothly shrink inner layers (12A) ~ (12C).

[0031]

Also, inner layers (12A) ~ (12C) of each section only slightly contact the suction tube of the extraction pump due to the measurement thereof and cannot bend the suction tube. Therefore, shrinking of inner layer (12) does not have a negative influence on the operation of the extraction pump and the extraction pump can be operated normally until the residue of the contents is extracted.

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[0032]

Second embodiment

Figure 4 and Figure 5 are lateral cross sectional views of the body in the second embodiment of the laminated bottle according to the present invention, Figure 4 shows the state after inner layer (12) has shrunk, and Figure 5 shows the state before it has shrunk.

[0033]

In laminated bottle (1) of the second embodiment, the lateral cross section of the body is formed into an approximately oblong shape and four joint parts (13) that join outer layer (11) and inner layer (12) are provided. Four joint parts (13A), (13B), (13C), and (13D) are arranged at the center of the four side surfaces (2A), (2B), (2C), and (2D) of the body and extend linearly along the axial direction of laminated bottle (1). One end of each joint part (13) extends to the extreme end of cylindrical shape opening part (3) and the other end extends to the center of the bottom part of the body.

[0034]

By arranging joint parts (13A) ~ (13D) as described above, separating measurement ( $L_1$ ) measured along the circumferential direction of two adjacent joint parts (e.g. 13A and 13B) becomes the same measurement as measurement  $L_2$  measured linearly between the aforementioned two joint parts (13A) and (13B) through center of axis (P) of laminated bottle (1). This relationship in the measurement is the same also between joint parts (13B) and (13C), between joint parts (13C) and (13D), and joint parts (13D) and (13A).

[0035]

In the case of this second embodiment, inner layer (12) is divided into four sections according to joint parts (13A) ~ (13D). The divided number of inner layer (12) differs between the first embodiment and the second embodiment, but the same functional effects as the first embodiment are manifested in the case of the second embodiment.

[0036]

Namely, inner layers (12A), (12B), (12C), and (12D) of the four divided sections are peeled off successively from outer layer (11) then shrinks and the contents stored in inner layer (12) decrease.

[0037]

Divided inner layers (12A) ~ (12D) end shrinking at the point in time the middle section in the circumferential direction thereof contacts the suction tube of extraction pump. At the point in time all inner layers (12A) ~ (12D) end shrinking, all the middle sections of four inner layer (12A) ~ (12D) contact the suction tube of extraction pump as well as inner layers (12), (12B), (12C), and (12D) of adjacent sections making partial surface contact with each other.

[0038]

Inner layer (12) always shrinks in the form described above, hence almost all of the contents can be extracted with the extraction pump

[0039]

Incidentally, air holes (14) are provided to opening part (3) between joint parts (13) and when inner layers (12A) ~ (12D) shrink, air flows in between outer layer (11) and inner layers (12A) ~ (12D) from air holes (14) provided at the corresponding positions to shrink inner layers (12A) ~ (12D) surely and smoothly.

[0040]

Also, inner layers (12A) ~ (12D) of each section only slightly contact the suction tube of the extraction pump due to the measurement thereof and cannot bend the suction tube. Therefore, shrinking of inner layer (12) does not have a negative influence on the operation of the extraction pump and the extraction pump can be operated normally until the residue of contents is extracted.

[0041]

Manufacture of laminated bottle

Laminated bottle (1) in each of aforementioned embodiments can be manufactured as follows.

[0042]

First of all, a laminated parison or a laminated preform provided with a laminated structure that corresponds to the laminated bottle to be manufactured is molded by a means such as extrusion molding or the like. When molding a laminated parison or a laminated preform, the joint parts that extend along the axial direction are provided at the predetermined positions in predetermined number to span the entire length thereof and the areas of the outer layer and inner layer that are not the joint parts are left peelable.

[0043]

Then, the laminated parison or the laminated preform is set in a blow molding die and molded into the desired bottle shape according to the blow molding method.

[0044]

Incidentally, if the bottom part of the bottle is molded according to the pinch off process, the inner layers are completely joined to each other but the outside layers are not joined to each other. Therefore, if an impact is applied after molding such as the bottom part of the bottle is hit with a rod, etc., a slit is formed between the outer layer and the inner layer at the pinch off part and air flows between the outer layer and the inner layer from this slit. Therefore, if this process is performed, the inner layer can shrink even if air holes are not provided to the outer layer.

[0045]

Working example

Laminated bottle (1) of the first and the second embodiments was manufactured by composing outer layer (11) with polyethylene, composing inner layer (12) with nylon, and forming joint parts (13) by joining outer layer (11) and inner layer (12) with Adomer (trade name, product of Mitsubishi Petrochemical Industries Co., Ltd.). Favorable effects were obtained in both cases

[0046]

Also, in order to reduce the moisture permeability of inner layer (12), inner layer (12) was composed by laminating an Adomer layer on the inside of a nylon layer in manufacturing laminated bottle (1) of the first and second embodiments. Favorable effects were obtained in both cases.

[0047]

Effects of the invention

As was described above, according to the present invention, the contents stored in a laminated bottle can be completely extracted and the contents that cannot be extracted can be almost totally eliminated since three or more joint parts that extend along the axial direction are provided separated from each other in the circumferential direction and the separating measurement between two adjacent joint parts measured along the circumferential direction and the measurement between said two joint parts measured linearly through the center of the axis of the laminated bottle were set to be about the same.

Consequently, superior effects are manifested such as being able to use the resources effectively and being very economical.

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[0048]

Also, due to having set the measurement as described above, there are the effects of the shrinking of the inner layer not having a negative influence on the operation of the extraction pump even if the suction tube of the extraction pump is arranged at the center of the axis of the laminated bottle and being able to operate the extraction pump normally remove all the liquid.

Brief description of the figures

Figure 1 is a lateral cross sectional view showing the state after the inner layer of the laminated bottle in the first embodiment of the present invention had shrunk.

Figure 2 is a lateral cross sectional view showing the state before the inner layer of the laminated bottle in the first embodiment of the present invention had shrunk.

Figure 3 is a plan view of the laminated bottle in the first embodiment of the present invention.

Figure 4 is a lateral cross sectional view showing the state after the inner layer of the laminated bottle in the second embodiment of the present invention had shrunk.

Figure 5 is a lateral cross sectional view showing the state before the inner layer of the laminated bottle in the second embodiment of the present invention had shrunk.

Figure 6 is a lateral cross sectional view showing a state after the inner layer of a conventional laminated bottle had shrunk.

#### Explanation of reference numerals

(1)...laminated bottle, (11)...outer layer, (12), (12A) ~ (12D)...inner layers, (13), (13A) ~ (13D)...joint parts, (14)...air hole.

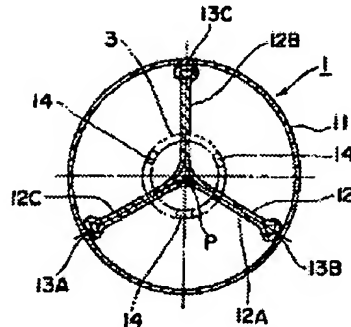


Figure 1

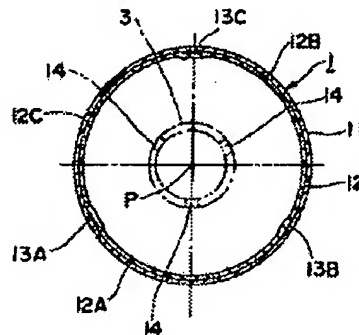


Figure 2

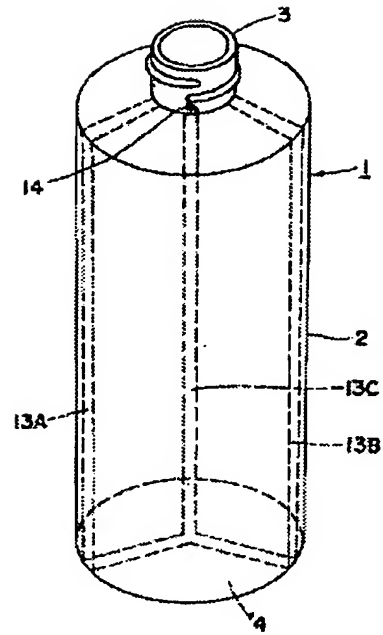


Figure 3

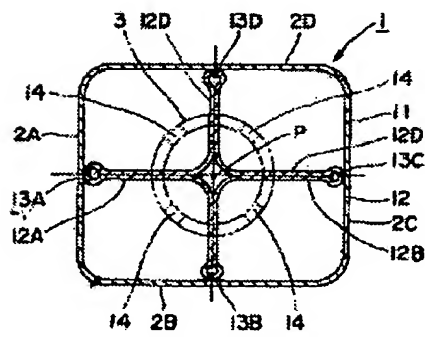


Figure 4

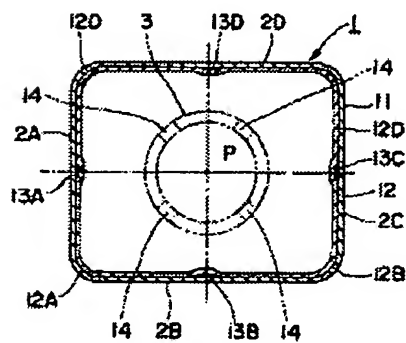


Figure 5

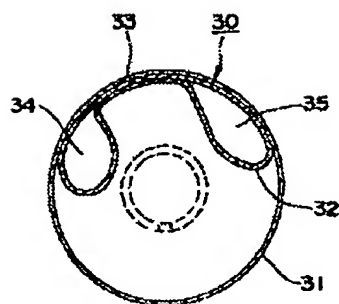


Figure 6